5.0 Answers to Issues and Key Questions

The purpose of this chapter is to provide the reader with short answers to the questions raised within each issue.

5.1 Vegetation Dynamics

Key Questions -

Non-Forested/Rangeland Vegetation

1) How has the structure of rangeland areas changed? (Indicator – canopy densities)

   Rangelands, primarily sagebrush communities, have become more homogeneous with increased densities and ages of individual plants, than would have been expected historically. Less than 10 percent has been disturbed (converted to an early seral stage) in the last 30 years. Many of those acres have now returned to pre-disturbance densities.

2) How has the disturbance regimes of the rangeland areas changed? (Indicator – disturbance frequency)

   Historic disturbance regimes of 20 to 40 year fire return intervals have been replaced with total suppression of wildfire. Only the 10 percent of the area that has burned in the last 27 years is within the expected return frequencies.

3) How has the increased presence of noxious weeds affected rangelands. (Indicator – acres of infestation by species)

   Noxious weeds have been mapped on more than 800 acres with the watershed. Noxious weeds out compete and replace native species, are often unpalatable to livestock and wildlife, and often reduce the watershed protection value of the vegetative cover.

Forest Vegetation

1) How has the structure of the forested areas changed? (Indicator - structure class reported by cover type)

   Answer: As a general rule, there is far more acres of mature and old forested vegetation than is believed to have occurred historically. Trees do not live forever, and the more acres of older trees, the greater the chance that a major change to early seral will occur in a short time span as a result of an unusually severe natural disturbance.

Age	Spruce/fir	Aspen	Lodgepole Pine	Douglas-fir
Seedling/Sapling	<5%	5%	9%	2%
Young/Mid	0%	45%	12%	30%
Mature & Old	>95%	50%	79%	68%

For the area of the watershed that data from the early 1900's is available, the age structure of Lodgepole has changed from only 8% classified as old or mature to the current 79%, Douglas-fir has changed from 61% sapling and young to 68% mature and old.

2) How has the density of the forested areas changed? (Indicator - density reported by cover type)

   Answer: Densities have increased for all covertypes. Succession and stand development has continued without historically light fire disturbances that would have 'thinned' the stands and controlled changes in composition. Dead and live fuels have accumulated to levels that preclude a low severity fire except in seral aspen stands.

3) How has the species composition of the forested areas changed? (Indicator - species composition reported by cover type)

   Answer: Species composition has changed in many of the covertypes due to succession to more shade tolerant species. Spruce and subalpine fir have developed in historically maintained Douglas-fir and mountain brush sites. Aspen has or is succeeding to conifer species on many acres. Lodgepole pine is succeeding to subalpine fir. Douglas fir is both gaining acres into sage brush and mountain brush sites and loosing acres to spruce/fir.

4) How has the disturbance regimes of the forested areas changed? (Indicator - disturbance regimes reported by cover type)

   Answer: Insect and disease disturbance continues to fluctuate with drought cycles but the ever increasing age of the forested vegetation increases susceptibility to more widespread consequences with each infestation. The fire regime for all covertypes has been altered such that the relatively frequent, low-intensity fire opportunity has been lost. Although lethal fire events are natural for all of these covertypes, the loss of the intervening low intensity fires has resulted in an unnatural build-up of live and dead fuels. The result is the high probability of a more severe fire event when it does occur with correspondingly greater adverse effects to soil, water, and wildlife.

5.2 Hydrologic Processes and Water Quality

Hydrologic processes and water quality within the watershed may be being impacted by past and present activities. Do we have a larger scale document to tier to?

Key Questions -

1. How are physical stream channel dynamics, including isolation of floodplains, constraints on channel migration, and the movement of large wood, fine organic matter, and sediment being impacted? (Indicator(s) – RHCA road density, Rosgen channel types??, stream side vegetation??, etc reported by sub watershed)
2. How are point source pollutants such as selenium impacting streams and other water sources? (Indicator(s) – source proximity to water, reported by pollutant by sub watershed)
3. How are non-point source pollutants, such as sediment, impacting streams? (Indicator(s) – pollutant level reported by sub watershed)

5.3 Soil Productivity

Soil productivity within the watershed may be being impacted by past and present activities.

Key Questions -

1. What are the major livestock grazing soil impacts in the watershed?

   The major livestock impacts to soils include; compaction in riparian areas and around water developments, and accelerating erosion by removal of ground cover through over utilization and concentrated use (loafing areas, trailing, driveways), and stream bank shear.

2. Is recreation use (camping and ATV use) causing a significant increase in soil disturbance, in the form of erosion, sediment delivery or compaction?

   Recreation pressure is increasing including more dispersed camping locations and more off-road vehicle use, mostly on designated trails but some unauthorized, cross-country use. Specific sites are being significantly impacted but the level of impact across the watershed is not significant. Camping with larger vehicles is compacting and denuding new areas and ATV use is causing increased erosion, loss of ground cover, and soil displacement where new routes are pioneered. The dispersed camping activities are occurring within riparian areas (Home Canyon), meadows (along Snowslide Canyon), and on upland sites like Fox Flat. Most of this ATV activity is occurring on ridges and upland sites in the watershed. Increasing legal ATV on designated trails is also causing detrimental effects when trail maintenance can not keep downfall cleared (side trails are developed) and drainage structures are not kept functional.

3. Is mining, both active and inactive, affecting the watershed soils?

   There is no active mining in the watershed. Old mines are contributing to erosion, sediment, and selenium discharges.

4. How has fire (both wildfire and prescribed fire) affected soil stability?

   The only known fires in the last 100 years have been prescribed burns in the sagebrush communities. These prescribed burns were initiated to reduce sagebrush densities and increase grass and forb forage. The long term effect of these treatments is greater watershed protection because of greater ground cover and root masses.

5. How susceptible to management activities are the land types found within the watershed?

   See table in Chapter 3.

6. How much of the watershed has been detrimentally disturbed by past activities?

   This value is hard to sample for. An estimate in chapter 3 is made evaluating mining, timber harvest, cattle trailing and water developments. Even it is assumed that every acre of past logging is detrimentally affected and a every mile of fenceline has some level of trailing along it, less than 1.5 percent of the watershed is in an impacted condition.

7. At what point is an impact to soil no longer considered detrimental?

5.4 Native Fish Habitat

1. How and to what extent has the historic migration of Bonneville cutthroat trout been affected by land management activities, particularly irrigation diversions, dams, and drainage structures?

   Historic migration patterns of Bonneville cutthroat trout have been severely impacted in the analysis area. Impacts include Montpelier Dam, irrigation structures and canals, and the culvert under Montpelier.

2. What are the dominant sediment delivery mechanisms in the analysis area and how did they compare with natural processes? Where are the high-risk areas?

   Cattle grazing and roads are the primary sources of sediment in the analysis area. For cattle-related sedimentation, the high-risk areas include Snowslide, lower Little Beaver, and Home Canyon Creeks. Road-related sedimentation high-risk areas include Snowslide Creek (FS Road 801), Whiskey Creek (FS Road 801), and Home Canyon Creek (FS Road 149).

3. How and to what extent has the historic habitat quality and quantity of Bonneville cutthroat trout and other native species been affected by land management activities? What actions are required to address these factors?

   Bonneville cutthroat trout habitat has been affected by cattle grazing, road construction/maintenance/use, irrigation diversions, mining, and dispersed recreation. Actions to address these impacts can be found in the Opportunities section.

4. How and to what extent has native fish in the analysis area been affected by the introduction of non-native fish? What actions are required to address these factors?

   Non-native fish have been introduced throughout the analysis area and dominate the salmonid communities. There are some opportunities to selectively knock back non-native fish populations, particularly in Whiskey Creek, where Bonneville cutthroat trout appear to maintain dominance over non-native brook trout.

5.5 Wildlife Habitat

The wildlife habitat has been impacted by past and present human activities or natural processes.

Key Questions -

1) How and to what extent have human caused changes to habitat affected TES, MIS and other key wildlife species?

   Motorized access density is at or below 1.5 miles/square mile. Domestic livestock grazing consumes forage otherwise available for big game and ground nesting and foraging birds. However, elk populations are high and meeting State population goals and deer populations are fluctuating within expected levels. Roads exist within the riparian areas of several streams reducing their potential as wildlife habitat. Beaver and migratory birds are probably below potential because of these lost acres.

   Conversion of large tracts of basin big sage and willow bottomlands to agricultural lands has reduced sage grouse habitat and winter range capacity. Highways, cities, and housing developments have had a similar impact in addition to altering migration patterns and linkage habitat.

   Logging has provided the only early-seral forested vegetation in the watershed, affecting less than 10% of forested acres.

   Increasingly powerful and popular snowmachines have the potential to affect wolverine denning if the higher eleveations of the watershed are suitable and occupied.

   Rangeland vegetation treatments over the last 40 years (spraying, plowing, and seeding) have altered the natural composition of understory plants in Whiskey Creek and Montpelier Creek. The effects to wildlife of these changes in plant composition are unknown. Prescribed fire has been used for the past 30+ years to manage sagebrush densities throughout the watershed, however less than 20% of the sagebrush types are estimated to be in early seral condition.

2) How and to what extent have natural changes in habitat affected wildlife species?

   Succession to late seral vegetation on most forested acres and some rangeland types favors late succession associated species like owls, woodpeckers, and goshawks. Early succession associated species, edge dwelling species, and opportunistic species have lost habitat. The lack of low-intensity thinning fires and stand replacing fires has changed the structural dynamics of forested and rangeland habitat. Fire caused mortality in forested vegetation has not occurred in the last 100 or more years, reducing this cyclic source of both standing snag and down woody habitat. However, insect mortality has occurred in older-aged forest, causing mortality (snags) and accumulated large down woody debris.

Aspen forests provide for the most diverse array of wildlife of all of the forested vegetation types. The diversity and quantity of forage (forbs, grasses, aspen shoots, bark, leaves, and buds) greatly exceeds conifer forests. As aspen forests succeed to conifer the forage production drops, affecting big game, birds, and small mammals, many of which are prey carnivores, raptors, and goshawks. Additionally, aspen are prone to various stem decay fungus that provide cavity nesting habitat as live or dead trees. Conifer are not as prone to heart rot as live trees, live longer, and as dead trees are often "hard snags" which fall over before providing cavity nest opportunities. Loss of as much as 45% of the aspen acres existing in the early 1900's represents a significant loss of potential diversity in the watershed.

Sagebrush is succeeding to conifer in the drier eastern portion of the watershed. The acres impacted by this advancement of conifer into sagebrush has not been determined but is readily visible from Geneva Summit north to the edge of the watershed.

No Threatened, Endangered, Sensitive, or Management Indicator Species are known to be adversely affected by this tendency towards advanced successional stages.